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# ZOÖLOGICAL BULLETIN.

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## ON THE OCCURRENCE OF DISTOMUM OVOCAUDATUM VULPIAN IN AMERICAN FROGS.

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IN the spring of 1893, the writer found a number of specimens of this trematode inhabiting the Eustachian recesses of the American frog, *Rana clamata*. At that time no satisfactory description with figures of *D. ovocaudatum* had been published, and I was therefore unable to determine positively whether or not the worms which I had discovered were of that species. A comparison of the American worms with specimens of *D. ovocaudatum* preserved in the collection of the Zoologisches Institut in Leipzig has shown me conclusively, however, that the two are identical in all important characteristics. I believe that the occurrence of this species in America has not been reported heretofore.

Previous writers, with the exception of Sonsino, have described this worm as being found only under the tongue of the frog. Sonsino ('93) reports finding it not only under the tongue, but also in the stomach and first part of the intestine, and in a single case in the lung. There is nowhere mention of its occurrence in the Eustachian tubes. In the American frogs, however, this seems to be its normal place of attachment, and in living frogs I have never found it in any other position. In a few cases I have found worms lying unattached in the mouths of frogs which had been killed by chloroform, but in such cases it is probable that the action of the chloroform had caused them to loosen their hold, though I have no means of knowing what their place of attachment had been.

In the rather small number of living or freshly killed European frogs which I have been able to examine in Leipzig, I have found but one specimen of *D. ovocaudatum*, but the fact is suggestive that that one was attached in the Eustachian tube of *Rana esculenta*. That I have not found *D. ovocaudatum* under the tongue of American frogs may be due to accident or oversight. It seems, on the other hand, not improbable that the failure of observers to find it in the Eustachian tubes of the European frogs may be due to the same cause. It would not surprise me if future investigation should show that it occurs as frequently in that position as under the tongue where it has hitherto been observed.

The abundance of this parasite seems to vary greatly from year to year. In the spring of 1893 it was quite abundant in the vicinity of Boston, perhaps as many as one out of every three or four frogs used for laboratory dissection harboring specimens of the worm. During the next two years, although a careful watch was kept for them, not a single specimen was found in the frogs similarly used, although they were collected from the same locality and the number examined was larger. A similar variation for the vicinity of Leipzig has been mentioned by Looss ('94).

There are several points in the anatomy of this species upon which previous writers are not in agreement. One of these is the position of the ovary, which is stated by Sonsino to be upon the left side ; Looss found it always upon the right side. In an examination of ten worms with respect to this point, I found that in nine cases the ovary was on the left side (as was the case also in the single Leipzig specimen), in one upon the right. In the same specimens the posterior testis was in seven cases the left one, in three the right. Several other worms had the testes so evenly placed that they could not be counted in either of these lists. From this very small number of observations it would appear that the variations in position of ovary and testes are not strictly correlated.

The egg capsules in this species are terminated at one end by filaments which are described by Vulpian ('59), Creutzburg ('90) and Looss as being from one to one and one-half times the

length of the capsule itself. Sonsino finds in the case of specimens collected in the vicinity of Pisa that the filaments are from four to six times the length of the capsule. The American worms agree in this respect with those of central Europe, and in no case have I found the filaments exceeding in length the measurements given by the French and German observers. It would seem not improbable that the greater length of these filaments in the eggs of Italian specimens may be dependent upon the warmer climate in which they live.

The position of the genital pore is, as described by Looss, immediately behind the pharynx, not immediately in front of the ventral sucker, as is implied by the statements of Creutzburg and Sonsino. The statements of these authors differ widely also concerning the presence of a penis. Sonsino speaks of a "bursa del pene" lying in front of the ventral sucker, and Creutzburg of a "verstulpbaren Cirrus" contained in the "Samenblase." Looss writes: "In wirklichkeit ist weder von einem Cirrusbeutel noch von einem Cirrus eine Spur vorhanden." My own observations are in entire agreement with the statements of the latter author. The seminal vesicle I have found in some cases filled by a mass of sperm which *in toto* preparations or in the living animal might be easily mistaken for a retracted penis. Sections show, however, that the seminal vesicle is merely a simple thin-walled tube, with no considerable muscular thickening or other modification which can be interpreted as a penis.

The vitellary glands are very aptly described by Creutzburg as "traubige zusammengesetzte Organe." That Looss describes them as clover-leaf-shaped is doubtless due to the fact that he studied them in worms so distorted by pressure as to produce such an appearance. The disagreement must be attributed to the "primitiv und barbarisch" method employed by the latter author. The glands consist of about nine nearly spherical masses clustered upon the vitellary ducts in a manner very suggestive of grapes in a cluster, and the position of these glands in the extreme posterior end of the body affords a most simple means for recognizing the species.

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